

Comparison of two techniques of harvesting connective tissue and its effects on healing pattern at palate and recession coverage at recipient site

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Abstract

Aim: To compare the healing pattern in palate following harvestation of connective tissue graft by two different techniques and to compare the recession coverage at the recipient sites. **Materials and Methods:** 30 recession sites with Miller's class I and II recession in 16 patients were recruited for this study. Sites were randomly divided into 2 treatment groups. Group I used Unigraft Knife to harvest the connective tissue whereas in group II patients Langer & Langer techniques was used to harvest the connective tissue graft from the palate. Healing was evaluated at the donor site using- wound size (WS), immediate bleeding (iB) and delayed bleeding (dB), complete wound epithelialization (CE), sensibility disorders (S) and post operative pain (PP) at baseline, 1st, 4th, and 12th week postoperatively. Recession coverage was assessed by measuring Clinical Attachment Level (CAL), vertical recession (VR), width of keratinized gingiva (KT). **Results:** On comparison between Group I and II, a statistically significant larger wound size was observed in Group I. CWE was higher in Group II. A non significant difference was observed when SD, and delayed bleeding were compared at all time intervals. A non-significant difference was observed in the clinical parameters at the recipient site. **Conclusion:** When evaluating the WS and CWE, the Langer and Langer technique was found to be better than the Unigraft knife technique for harvesting the connective tissue graft, whereas both the techniques were found to be effective in root coverage procedure outcomes.

Keywords: Connective tissue graft, free gingival graft knife, parallel incision technique, recession coverage

Introduction

In the past decade, the desire for cosmetic dentistry has increased tremendously. Periodontal plastic surgery procedures address these esthetic and functional demands and have become an integral part of the periodontal treatment. Several therapeutic modalities such as free gingival autografts, pedicle grafts, connective tissue graft, grafts combining the two modalities, and guided tissue regeneration have been used for covering the denuded roots and to augment the width and thickness of the keratinized gingiva.^[1] These procedures have resulted in reduction or elimination of root hypersensitivity, improved esthetics, and facilitation of plaque control.^[2,3]

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Among various surgical techniques, subepithelial connective tissue (SECT) grafts remain the most commonly used and most successful root coverage procedures. The esthetic and functional success of SECT graft techniques is highly predictable and reliable which has been documented in several longitudinal studies.^[4-6] These advantages have given root coverage procedures a common place in the clinical practice.^[6,7]

Thickness and volume of the tissue to be harvested from the donor site are among the important factors in determining the appropriate treatment method. Variations of size and shape of the palatal vault may also affect the dimensions of the donor tissue harvested.^[8] Although an ample number of studies have evaluated the results of utilizing SECT graft at the recipient site, a very few studies are focused on evaluating the wound healing and assessing patient-centered outcomes at the palatal donor area.^[8-10] Furthermore, the oral cavity provides a unique environmental challenge for the healing wounds produced during various periodontal surgical procedures.

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The ideal technique for procuring a connective tissue graft should harvest an adequate graft, be user-friendly, produce minimum palatal discomfort, have minimal operative complications, and create a wound in the donor area that heals quickly with minimal postoperative complications. Various techniques have been developed for harvesting soft tissue grafts from the palate such as trap door technique,^[11] parallel incision technique,^[11] and single incision technique.^[12]

In the present study, a new instrument “Unigraft knife” (also called the “free gingival graft knife” from Ace Surgical Supplies) was used which when activated elevates a partial thickness flap beneath which the connective tissue graft is procured. The healing of the palatal wound created with this knife was compared with the wound created by Langer and Langer trap door technique.^[4] The purpose of the present study was to evaluate and compare the healing of the wound at the palatal donor site and root coverage results of the two different techniques.

Materials and Methods

Sixteen systemically healthy patients with 30 sites (gingival recession ≥ 2 mm) were recruited from the outpatient Department of Periodontology and Implantology who presented with Miller Class I and II recession (≥ 2 mm). Noncomplaint patients, patients with root surface restoration, current smokers, or tobacco users were excluded from the study. Thirty recession sites were divided into two equal groups with 15 recession sites each, that is, Group I, which received the graft procured with the Unigraft Knife (Ace Surgical Supply Co., MA, Figure 1c) and Group II, which received the graft harvested by the Langer and Langer technique.^[4] The randomization was done by a coin flip technique as the study involved only two groups.

All the enrolled patients underwent phase 1 periodontal therapy and were given oral hygiene instructions to ensure that they would adopt the correct brushing technique. Full mouth plaque scores (FMPS)^[13] and full mouth bleeding scores (FMBS)^[14] were recorded initially and after scaling and root planing. Oral hygiene instructions were reinforced at every visit. Surgery was not carried out till the patients reached FMPS $< 20\%$ and FMBS $< 20\%$.^[10]

Parameters implied for evaluation of healing pattern at the donor site included the measurement of – wound size (WS), immediate bleeding (iB) and delayed bleeding (dB), complete wound epithelialization (CE), sensibility disorders (SD), and postoperative pain (PP) at baseline, 1st, 4th, and 12th week postoperatively.^[13,15] The day of surgery was taken as baseline in both the groups.

WS measurements were made by measuring the surface area of the palate from where the graft was procured that appeared to be granulating in or clinically did not appear to

be covered by epithelium. Measurements were made with a periodontal probe (UNC-15) to the nearest measurement of 0.5 mm.^[9,13]

iB and dB were assessed and iB was recorded as positive if the donor area presented with bleeding after 2 min application of external pressure with a sterile gauze. dB was measured as positive if the patient presented with prolonged hemorrhage from the palate during the postsurgical period.^[13]

CE wound was assessed clinically by means of colored photographs taken at each postsurgical visit. The scores were assigned as follows: 0 = No color match with adjacent tissues, 1 = Partial color match with the adjacent tissues, and 2 = Complete color match with the adjacent tissues.^[10]

SD was assessed by means of a periodontal probe (UNC-15, Hu-Friedy) using a 4-point discrimination scale (coronal, apical, mesial, and distal) around the donor area before and after the surgical procedure and the follow-up visits. Identical assessment was made at the same time in the corresponding contralateral area to collect the most reliable data possible. Objective sensory loss was recorded using a rubbing movement and a pin-pressure nociception. Patients were asked to give a rating of their loss of sensibility based on a 3-point verbal descriptor scale (“none,” “mild or moderate,” “severe”).^[10]

PP: At the subsequent postoperative appointments, the patients were asked to rate their discomfort level in the palate for the previous week. The numbers of pills taken for pain were also noted down for each patient.^[9]

Visual analog scale (VAS) was used, and pain was assessed by asking the patients to rate the intensity of the pain perceived in the palate donor area at 1st and 4th week using 100 mm horizontal scale with the left endpoint marked “worst pain imaginable” as the primary efficacy parameter. The patient was asked to move a finger on the VAS tip which coincided with the level of pain experienced.

Verbal rating scale (VRS) was also used, and a “5-point VRS” (no pain, mild pain, moderate pain, severe pain, and very severe pain) was used to rate the discomfort level in the palate donor area at the postoperative appointments.

All the clinical measurements were made by the same examiner only, to avoid any inter examiner bias. Except for the evaluation of colored photographs for CE where three examiners scored the photographs separately, a mean was taken as the final score.^[10]

On evaluation of healing pattern at the recipient site, the clinical parameters were assessed at the baseline, 3rd, and 6th month. These included the clinical attachment level (measured as the distance from cemento-enamel junction to

the base of the pocket), vertical recession (VR measured as the distance from cemento-enamel junction to the free gingival margin at the mid-buccal level), and width of keratinized gingiva (KT measured as the distance from most apical position of gingival margin to the mucogingival border at the buccal tooth surface).^[14,15]

Recipient-site preparation

Initially, in both groups at the recession site, a full mucoperiosteal flap using horizontal and vertical incisions was raised according to the Langer and Langer technique,^[4] sparing the proximal papillae.^[4] In the apical areas, the flaps were made partial thickness by a sharp dissection. All the recipient areas were treated in a similar fashion so that the only difference in the therapy each group received was the method used to obtain the graft.

Further, for the donor site, one of the two techniques for harvesting the graft (unigraft knife method or Langer and Langer technique) was used to harvest the required amount of SECT graft for the recession sites as per the randomization table.

Procedure followed for unigraft knife group: Group I

A palatal region from the first molar to canine was utilized for procuring the required amount of SECT graft. Anesthesia was given by infiltrating the area with lidocaine and epinephrine 1: 80000. The donor area was sounded with a periodontal probe to ensure that there was a minimum of 3 mm soft tissue thickness. Unigraft knife was assembled in a conventional manner to permit cutting in a pulling motion. The knife was assembled with a cutting shoe reversed so that the cutting shoe would cut in a pushing direction. It was then used to elevate a partial thickness trap door flap by pushing the knife, under control, distally across the palate. This trap door flap was retracted mesially to permit access to the connective tissue beneath it. The distal border of the flap was allowed to remain attached to the palate. The knife was then assembled in a conventional manner to permit cutting in the pull motion. Now, starting at the distal edge of the trap door flap, the knife was then used to elevate a connective tissue flap [Figure 1a-k]. This secondary flap, made up of connective tissue, was incised at the mesial edge. Pressure was applied with wet gauze to the donor area. Interrupted sutures were placed at the borders of the trap door flap.^[9]

Procedure followed for Langer and Langer technique: Group II

Anesthesia was obtained in a similar manner as in unigraft knife method. Palatal donor area was sounded with a periodontal probe to ensure 3 mm soft tissue thickness. A pair of parallel incisions (1.5 mm apart) were made into the palate in the area of the first molar to canine. The incisions were made with a single 10–12 mm deep pass of no 15 blade mounted on BP handle. The parallel incision was made at least 2–3 mm from the gingival margin in the palate. Vertical

incisions were placed at the mesial and distal end of the most external incision. A 4-0 silk suture was placed through the palatal tissue to retract the palatal tissue and to provide access to the tissue between the initial incisions. The tissue was then removed by incising the mesial, distal, and medial edges between the parallel incisions. Pressure was applied with wet gauze to the donor area [Figure 2a-i]. The palatal wound was closed with sutures in the vertical incision and also using the suture that had been used to retract the palatal tissue for access.^[10]

In both the groups, the procured graft from the palate was secured over the recipient site using vicryl 4-0 sutures [Figures 1k and 2i]. The overlying flap was sutured as coronally as possible to cover the connective tissue graft. After closure of the vertical incisions, a mild compression with gauze soaked with sterile saline solution was done for 5 min to reduce the size of the clot. A periodontal dressing was placed over the recipient site and on donor site to protect the underlying tissue for 10 days postoperatively.

Postoperative instructions included the use of 0.2% chlorhexidine gluconate rinse twice daily and avoidance of trauma to the surgical areas. Amoxicillin was prescribed thrice daily for 5 days and ibuprofen, as needed.

Results

The statistical analysis was done using SPSS version 15.0 statistical analysis software (Statistical package for the social sciences (SPSS), Version 15.0, IBM, Chicago, IL). The values were represented in number (%) and mean \pm standard deviation and to test the significance between two means (Group I and II) the Student's *t*-test was used. For comparison of change in parameters in two groups at different time intervals, paired *t*-test was used. Since this study was aimed to assess the early healing of the wound at the palatal donor site by comparing Langer and Langer trap door technique and a unigraft knife method for obtaining the connective tissue graft for the treatment of buccal gingival recession, the recipient site was treated in a similar fashion in both the groups. All the patients completed the study period, and there was no drop-out. No complications were observed in any patient, and all patients responded well to the treatment and follow-up visits.

Patients in both the groups exhibited pain at 1-week follow-up which was higher in Group I than Group II, but it was statistically not significant. As per VAS measurements, the patients reported mild to moderate pain at the donor site [Table 1].

On evaluation of scores from VRS scale, the pain reported by Group I patients was of moderate intensity whereas for Group II, dull pain was reported by the patients at 1-week interval. However, at subsequent follow-up visits, none of

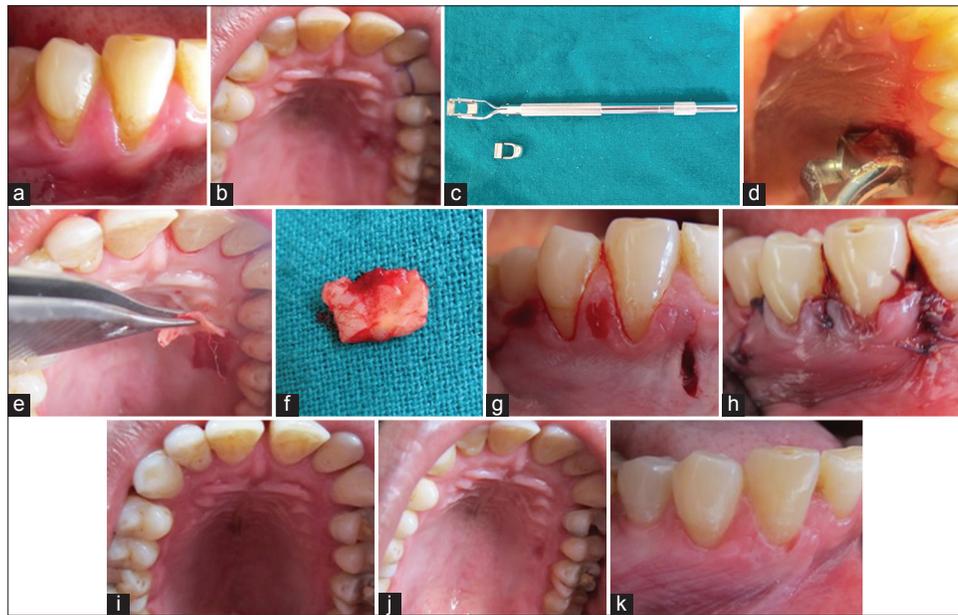


Figure 1: (a) Preoperative view of recession site. (b) Preoperative view of the palate before harvesting the graft. (c) Unigrift knife with its handle and additional blade. (d) Intraoperative view using unigrift knife for connective tissue graft harvesting. (e) Intraoperative view of palate during graft procurement. (f) Connective tissue graft. (g) Intraoperative flap reflected. (h) Suturing done after placing the harvested CT graft. (i) Postoperative view of recipient site - after 12 weeks. (j) Postoperative view of recession coverage at recipient site after 4 weeks. (k) Postoperative view of recession coverage at recipient site after 6 months

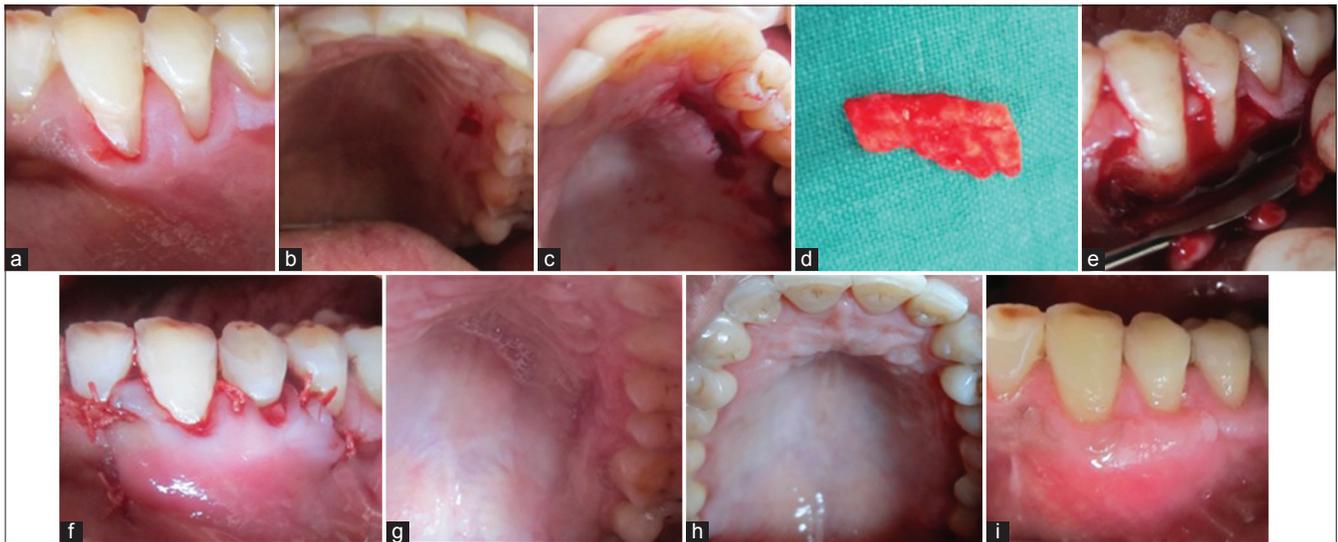


Figure 2: (a) Preoperative view of recession site. (b) Parallel incision given to harvest. (c) Intraoperative view following graft harvesting. (d) Connective tissue graft harvested with parallel incision technique. (e) Intraoperated flap reflected. (f) Suturing done after harvesting the graft. (g) Postoperative view of the palate - after 1 week. (h) Postoperative view of the palate - after 4 weeks. (i) Postoperative view of recession coverage at recipient site - after 6 months

the patients in either of the groups reported pain, till the conclusion of the study.

PP was also assessed as per the number of NSAID pills taken by the patients in both the groups. It was found to be similar at 1 week postoperative interval, and no analgesic pill intake was reported by any patient at 4 and 12 weeks follow-up intervals.

When all the parameters of the PP, i.e. VAS, VRS, and NSAIDS pills taken were analyzed collectively, the amount of pain reported at 1 week in both the groups was significantly higher than at subsequent time intervals [Table 2].

Reduction in WS from baseline to all follow-up time intervals was significantly faster in both the groups, but the rate of WS reduction was much faster in Group II compared to Group I [Table 3].

Table 1: Comparison of complete wound epithelisation, delayed bleeding, sensibility disorders, at different time intervals

Time interval CE	1 week			4 week			12 week		
	dB	S	CE	dB	S	CE	dB	S	CE
Group I									
Mean	1	1.2	0	1	0	0	2	0	0
SD	0	2.78	0	0	0	0	0	0	0
Group II									
Mean	1	1	0.07	1.8	0	0	2	0	0
SD	0	2.07	0.26	0.41	0	0	0	0	0
Significance of difference									
"t"	0	0.223	-1	7.483	-	-	0	-	-
"p"	1	0.825	0.326	<0.001	-	-	1	-	-

dB: Delayed bleeding; CE: Complete wound epithelisation; S: Sensibility disorders; SD: Standard deviation

Table 2: Comparing the VAS, VRS, PILLS in both the groups at different time intervals

Time	Group I		Group II		Significant difference	
	Mean	SD	Mean	SD	t	P
VAS						
1 week	34	23.24	24.67	15.98	1.282	0.21
4 week	0	0	0	0	0	0
12 week	0	0	0	0	0	0
VRS						
1 week	2.67	1.18	1.8	0.77	2.385	0.024
4 week	0	0	0	0	-	-
12 week	0	0	0	0	-	-
Pills taken						
1 week	5.6	2.03	5.53	3.4	0.065	0.948
4 week	0	0	0	0	-	-
12 week	0	0	0	0	-	-

SD: Standard deviation; VAS: Visual analog scale; VRS: Verbal rating scale

Table 3: Comparison of wound size (WS) at different time intervals

Time interval	WS			
	Baseline	1 week	4 week	12 week
Group I				
Mean	180.9	88.2	20.13	0
SD	28.77	27.71	5.27	0
Group II				
Mean	168.8	12.87	3	0
SD	49.45	7.45	6.21	0
Significance of difference				
"t"	0.819	10.169	8.145	-
"p"	0.42	<0.001	<0.001	-

Complete wound epithelization was also achieved at a faster rate in Group II as compared to Group I. The difference in the rate of CE was significantly higher ($P < 0.001$) from baseline to 1 week in both the groups [Table 4]. dB was seen at 1-week follow-up in both the cases which was higher in Group I, but was not statistically significant ($P = 0.825$). No postoperative bleeding was observed on further follow-up visits in both the groups [Table 1].

SD was noticed in Group II at 1 week, but was not seen in Group I and also no SD was observed at any of the further follow-up visits in either of the groups [Table 1].

On evaluation of root coverage parameters at the recipient site, results showed difference in the mean VR, mean root coverage in both the groups to be nonsignificant ($P > 0.05$; Table 5). Intragroup comparison of mean width of keratinized gingiva (KT) showed no statistically significant difference ($P = 0.419$; Table 5) at all-time intervals. Intragroup comparison of mean KT showed that both the groups gained statistically significant amount of tissue at 3rd and 6th month postsurgically as compared to baseline ($P < 0.001$) [Table 6].

Discussion

There are several techniques available to obtain suitable SECT graft. Among the techniques used for SECT graft harvestation, Langer and Langer trapdoor method has stood the test of time. Langer and Langer method along with most of the techniques relies on free hand dissection of the palate and, therefore, is a highly technique sensitive procedure. The aim of the present study was to compare healing at the palatal donor area using two different surgical techniques to harvest a SECT graft for a root coverage procedure. The recipient sites were treated in a similar manner so that the only difference in the therapy each group received was the method used to obtain the graft. Thirty sites in 16 patients were selected (gingival recession ≥ 2 mm) for root coverage procedures.

This comparative, clinical, randomized study was designed to assess the differences in healing pattern and patient discomfort between the two groups. The connective tissue graft from the palatal site was harvested 2–3 mm away from the gingival margin for both the techniques.^[13,16] Harris in 1997^[9] also advocated that at least 3 mm of palatal mucosa (thickness) was needed for harvesting a connective tissue graft; therefore in our study, sounding with a periodontal probe was done in both the groups. A uniform connective tissue graft with a thickness of 1.5 mm was obtained using unigraft knife. For Langer and Langer trap door technique, freehand incisions were made 1.5 mm apart, and an effort was made to keep the thickness of the graft uniform. Two releasing vertical incisions were also given to facilitate the removal of connective tissue graft and to aid in wound closure.^[10]

Table 4 : Comparison of mean change in wound size and complete wound epithelisation at different time intervals in group I and group II

Comparison	Baseline vs 1 week		Baseline vs 4 week		Baseline vs 12 week		1 week vs 4 week		1 week vs 12 week		4 week vs 12 week	
	WS	CE	WS	CE	WS	CE	WS	CE	WS	CE	WS	CE
Group I												
Mean	-92.7	1	-160.77	1	-180.9	2	-68.07	0	-88.2	1	-20.13	1
SD	33.49	0	25.36	0	28.77	0	23.96	0	27.71	0	5.27	0
"t"	10.721	*	24.551	*	24.349	*	11.003	*	12.33	*	14.788	*
"p"	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	*	<0.001	<0.001	<0.001	<0.001
Group II												
Mean	-155.93	1	-165.8	1.8	-9.87	2	-9.87	0.8	-12.87	1	-3	0.2
SD	44.89	0	45.87	0.41	1.81	0	1.81	0.41	7.45	0	6.21	0.41
"t"	13.454	*	14	-16.837	21.143	*	21.143	-7.483	6.686	*	1.871	-1.871
"p"	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.082

* As SD value for all the comparison is 0, hence "t" value cannot be calculated. WS: Wound size; CE: Complete wound epithelisation

Table 5: Comparison of vertical recession, probing depth, clinical attachment level and width of keratinized gingiva in two groups at different time intervals. (Group I - Unigrafknife method and Group II - Langer and Langer method)

Time interval	Baseline				3 months				6 months			
	VR	PD	CAL	KT	VR	PD	CAL	KT	VR	PD	CAL	KT
Group I												
Mean	3.2	1.4	4.6	2.8	1.6	1.07	2.67	4.2	1.53	1.07	2.6	4.27
SD	1.42	0.63	1.4	1.66	1.18	0.26	1.18	1.74	1.14	0.26	1.14	1.68
Group II												
Mean	3.6	1.27	5	2.4	1.43	1.13	2.63	4.53	1.33	1.27	2.47	4.67
SD	1.12	0.59	1.41	0.91	1.4	0.35	1.29	1.25	1.38	0.46	1.2	1.18
Significance of difference												
"t"	-0.855	0.595	-0.777	0.82	0.352	-0.592	0.074	-0.603	0.432	-1.474	0.312	-0.756
"p"	0.4	0.556	0.82	0.419	0.727	0.559	0.942	0.551	0.669	0.152	0.757	0.456

VR: Vertical recession; PD: Probing depth; CAL: Clinical attachment level; KT: Keratinized gingiva; SD: Standard deviation

Table 6: Comparison of mean change in width of keratinized gingiva (KT) in two groups at different time intervals

Time interval	baseline vs 3 months	Baseline vs 6 months	3 months vs 6 months
Group I			
Mean	1.4	1.47	0.07
SD	0.83	0.81	0.18
"t"	-6.55	-7	-1.47
"p"	<0.001	<0.001	0.164
Group II			
Mean	2.13	2.27	0.13
SD	0.74	0.7	0.23
"t"	-11.12	-12.48	-2.26
"p"	<0.001	<0.001	0.041

SD: Standard deviation

flap. Studies have shown that total vascularization in the part of the connective tissue graft occurred when the flap at the recipient site completely covered it.^[17]

As per the best of our knowledge, no data have been reported in the literature regarding the assessment of depth of wound at the palatal donor area. Visual cues, such as wound bed color and wound measurements, cannot be relied upon.^[18] Therefore, apart from measuring the wound using UNC-15, clinical photographs were taken at each postoperative visit to access complete wound epithelization.^[10]

The WS was measured with UNC-15 (to the nearest of 0.5 mm) at 1 week postoperative visit was significantly larger in Group I as compared to Group II ($P < 0.001$; Table 3). This could have been the result of the high rate of sloughing of the flap seen with the technique using unigraf knife. If the knife was engaged superficially, a thin trap door flap was obtained which might have resulted in high rate of sloughing. Making the incisions freehand could

At recipient site, in both the groups, attempt was made to completely cover the connective tissue graft by overlying

have permitted a deeper trap door incision or a wider base on the trap door flap which may have helped to reduce the sloughing seen. At 4 weeks too, the mean WS was larger in Group I as compared to that in Group II ($P < 0.001$; Table 4). A deeper incision or a wider base in the unigraft knife group might have helped to reduce the sloughing. This was not possible as there are limited no of sizes of cutting shoe available for this knife.^[9]

At 4 weeks follow-up visit, although the wound area was epithelized, there was a depression seen at all the palatal sites in the Group I, whereas in the Group II, wound area was fully diminished at all palatal sites at 4 weeks follow-up except for 1 patient. By 12 weeks, in both the groups, complete epithelization of the palatal wound area had occurred and clinically wound area was fully diminished. The percentage of complete palatal wound epithelization using Langer and Langer trap door technique cited in the relevant literature is quite similar to that seen in our study. The rate of sloughing of the primary flap using the Langer and Langer trap door technique was similar to those seen in previous reports.^[19] Edel^[11] who performed this technique also reported that degeneration of the primary flap in most patients takes about 1 week. Harris, 1997,^[9] in a comparative study of the clinical healing in the donor area demonstrated that a high rate of sloughing occurs in the superficial flap when free gingival graft knife was employed. Unigraft knife method resulted in a larger wound area at 1-week postoperative visit than the Langer and Langer trap door method. This could have resulted due to a variation in the WS created by the unigraft knife where the flap design was such that the distal border instead of the medial one served as the base of the reflected primary flap. The base of the primary reflected flap in the Langer and Langer trap door was toward the mid-palate in the region of first molar and canine and was broader than the base of the primary reflected flap in the unigraft knife method.

Intragroup comparison of CE showed that in Group I, it was completed at 12 weeks postsurgery, whereas in Group II, it was completed at 4 weeks except for one patient where it was observed at 12 weeks period. This could be attributed to unusual wound healing response at the donor site. The results could be correlated to a study by Del Pizzo *et al.*^[10] who also found complete palatal wound epithelization by 4 weeks after surgery. Kahnberg and Thilander^[20] in a study on palatal healing in rats, noted that epithelization progressed from the wound borders, and reduction of the wound surface preceded by contraction of the wound margins and by epithelial cell migration.

At none of the time, intervals of iB were noticed in either of two groups. dB at 1-week postoperative visit was higher in Group I as compared to Group II, but the difference was not statistically significant ($P = 0.825$; Table 4). According to Griffin *et al.*, 2006,^[21] bleeding is associated with postoperative irritation or trauma, rather than the surgical

procedure. Proper care was taken in both the groups to ensure that postoperative instructions are abided by.

No statistically significant differences were observed regarding the return of sensibility in the palatal donor site in both the groups. Literature supports that transient-postoperative sensory dysfunction is a possible complication after harvesting the graft from the palatal region.^[22] Halata *et al.*^[23] were able to show different nerve endings in the hard palate. In addition to free nerve endings within the epithelium and lamina propria, they also found Merkel nerve endings, as well as Meissner and Ruffini corpuscles, inside the basal lamina and the adjacent connective tissue, all of which are sensitive to touch and pressure. Although SD is not an objective measurement, in our study, both 2-point discrimination and soft-touch discrimination were used which have been reported to be reliable methods to detect the function of these mechanoreceptors.

In both groups, mean VAS and number of analgesic pills intake in the group at 1 week were higher as compared to that in Group II, yet the difference was not statistically significant. No pain or number of analgesic pills intake was reported by any patient in both the groups after 4 and 12 weeks follow-up intervals.

Lengthy surgical procedures may create extensive tissue injury, prolong vasodilation that permits more fluid to accumulate in the interstitial spaces, and results in higher level of biologic mediators released by inflammatory and resident cells.^[21] Duration of the soft tissue grafting procedure is an important indicator for PP. However, differences in patient perception can also influence the levels of reported PP.^[16]

Both the unigraft knife method and the Langer and Langer trap door method simplify the technique for obtaining the SECT graft from the palate. Undoubtedly, in certain clinician's hands, with certain skill levels and in certain situations, one technique with or without the aid of instrument may be superior to another technique.^[9]

On assessing the root coverage parameters at the recipient site, it was found that the difference in the mean VR in both the groups at baseline, 3, and 6 months was not statistically significant. Mean root coverage achieved for Group I was 54%, whereas for Group II, it was 68.13% at final (6 months) postoperative visit. This could be explained by the fact that recipient area in both the groups was treated in a similar fashion. Harris, 1997,^[9] also observed similar trends on comparison of root coverage at the recipient site using the unigraft knife method and Langer and Langer trap door technique.

Intergroup comparison of mean width of keratinized gingiva (KT) showed no statistically significant ($P = 0.419$) difference at all time intervals. Intragroup comparison of mean KT showed that both the groups gained a statistically significant

amount of tissue at 3 months and 6 months postsurgically as compared to baseline. Transplanted SECT of subsequent size has shown the availability to result in predictable root coverage and increased width of attached gingiva. Wennström and Zucchelli^[14] reported that transplanted connective tissue from palate has an ability to alter the differentiation of epithelial cells of the thin covering coronally advanced flap to become keratinized cells. Granulation tissue formation derived from the periodontal ligament also contributes to the increased width of keratinized gingiva. Mucogingival junction regains its “genetically” defined position following its coronal dislocation with the coronally repositioned flap resulting in the increased gingival dimension.^[14,24] The increase in width of keratinized gingiva observed between 3 and 6 months has been attributed to creeping attachment.^[6,25]

Conclusion

Therefore, this study suggests that in terms of operator factors, both the techniques yielded sufficient SECT graft suitable for periodontal plastic procedure with minimal operative complication. However, unigraft knife technique created a slightly larger wound area at the palate as compared to the free-hand incisions made in Langer and Langer technique. The wound in the Langer and Langer trap door technique method healed slightly more quickly as compared to the unigraft knife method, thus might have accounted for less patient discomfort. During the study, it was observed that the use of unigraft knife was technique-sensitive and it was difficult to adapt the instrument in situations where the palatal vault was high and narrow. Because of only a few sizes of cutting shoes available for unigraft knife, its adaptation to a variety of anatomic forms of palate is limited. It could not compensate for the anatomic variations encountered on various occasions. The Langer and Langer trapdoor technique was more user-friendly as the angles of the free-hand incisions could be easily adjusted if some anatomic variations were encountered.

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Conflicts of interest

There are no conflicts of interest.

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